Chemical & Engineering NEWS

PHENOL, VINYL ACETATE

The recession begins to bite

A Key Chemicals Review Page 14

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Cover: USS Chemicals' phenol plant at Haverhill, Ohio. Photo courtesy of plant's builder, Pullman Kellogg

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Phenol and vinyl acetate hit by recession

Producers of key ingredients for adhesives and coatings are moving to withstand downturn in demand as slump deepens in housing and autos

A "foxhole mentality" characterizes U.S. producers of phenol and vinyl acetate at present. In effect, producers of these basic materials for adhesives and coatings are taking as conservative a stand as possible to ride out the deepening recession.

There is good reason for the current psychology. Demand in major markets for derivatives of phenol and vinyl acetate—housing, automobiles, and other consumer durable products—has fallen substantially, and the bottom is not yet in sight.

Therefore, the order of the day for phenol and vinyl acetate producers is stringent limits on inventories, production geared to current demand, and no plant capacity expansions. With such limitations, production of these two basic chemicals, used in making a host of other products, will fall at least 10% in 1980. More pessimistic sources foresee a 20% decline for phenol output and a somewhat smaller decline for vinyl acetate.

Longer term, production of these chemicals will recover as the major consumer markets recover. A suggestive pattern occurred in the previous major recession in 1974 and 1975. Phenol and vinyl acetate production followed the drastic decline in housing starts and recovered quite well as housing recovered in 1976.

If this pattern holds true in the current recession, phenol and vinyl acetate production will fall this year reflecting a slump in housing that began last year. Because of imprecision in yearly data, details are hard to pinpoint of the depth and duration of the slump in housing as well as in phenol and vinyl acetate production. However, in the past, it has been true that the more severe the recession, the sooner and more sharply it ended.

One significant characteristic of the previous recession expected again this time is a more drastic rate of decline in year-to-year housing starts than in related chemical production. Housing starts in 1980 may drop 40% from the 1979 annual rate to little more than 1 million units per year.

As a result, phenol production will be down a bit more than 15%, according to worst estimates. Vinyl acetate output will be down less, maybe 5 to 10%. By comparison, in 1974 and 1975, housing starts were off more than 35% year-to-year at the worst, whereas phenol and vinyl acetate production declined 25% and 15%, respectively.

The recovery of the two chemicals may be slower than for housing after the current recession. Since phenol and vinyl acetate have many other uses, changes in their production are dampened compared to changes in housing. Unfortunately, some of these other uses may go down as much as housing but recover more slowly in terms of chemical demand.

Automobiles are an example. Phenol as resin derivatives goes into autos in many ways. But since use of these resins is unlikely to increase much per car on a year-to-year basis, recovery of phenol use in automobiles could be slow. U.S. automobile production may have to struggle to regain former levels, especially if auto imports hold even or gain a greater share of the market.

Similarly, demand recovery for these two chemicals will be slower than in the past. Both phenol and vinyl acetate are mature products with slowing growth rates in recent years. Few new, large-volume uses have come on the scene recently, and none has appeared that suggests large future demand.

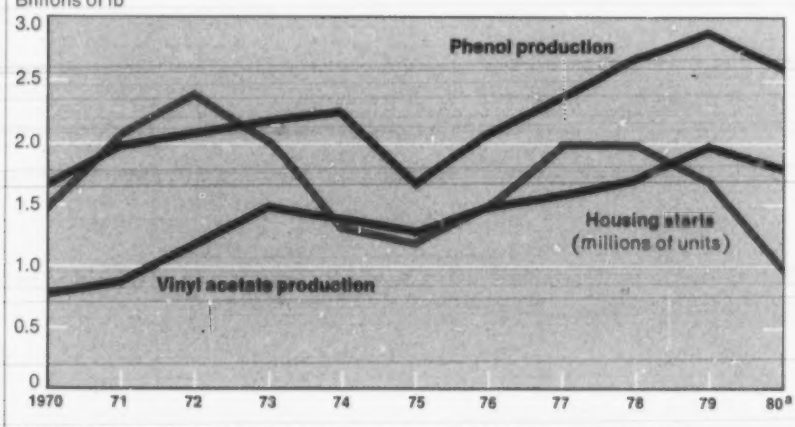
At this time, too, little chance exists for cutting production costs of these chemicals very much and thereby stimulating new uses to accelerate demand growth. Although relatively cheap in most of their use areas, both chemicals are hydrocarbons that require net energy inputs for their manufacture. This means that production costs will follow crude oil prices closely. Vinyl acetate has a little more hope than phenol through a switch to a low-cost methanol-based production process.

Small variations from the upward trend of hydrocarbon costs will occur, including some probably in 1980 in the current oil glut. These may relieve the strain on profitability somewhat for phenol and vinyl acetate as slackening demand shaves prices and profit margins on sales.

Producers hope to be able to resist price cutting to levels of unprofitability. If they do, their foxhole mentality will prove to have been well-advised caution.

Bruce Greek, Houston

Phenol, vinyl acetate output reflects housing starts cycles

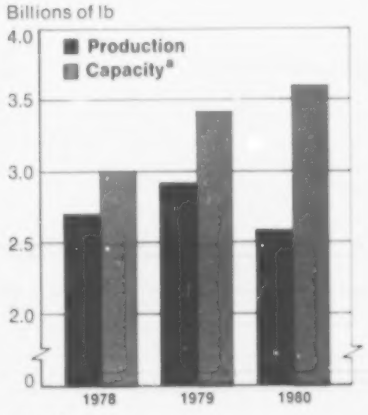


a C&EN estimate. **Source:** Department of Commerce, International Trade Commission, industry and C&EN estimates

Phenol

- ***Production slowing***
- ***Capacity increasing***
- ***Price outlook weak***

PRODUCTION/CAPACITY



a As of first quarter.

HOW MADE

Peroxidation of cumene, then split into phenol and acetone

MAJOR DERIVATIVES

Phenol-formaldehyde resin 45%, bisphenol-A 20%, caprolactam 10%

MAJOR END USES

Adhesives 50%, fabricated plastics 20%, fibers 20%

FOREIGN TRADE

Exports—falling off in 1980 to below 250 million lb, imports—negligible

PRICES

Bulk-volume contracts, 36 to 38 cents a lb, with discounts

COMMERCIAL VALUE

$900 million for total production, 1979; $1 billion, 1980

U.S. producers of phenol have turned pessimistic on prospects for the rest of 1980, although they say they had a good first quarter.

The biggest reason for the switch is a sharp downturn in new housing construction, combined with a smaller slowdown in other kinds of construction. Phenol is tied to housing through phenol-based adhesives for making plywood. These and other adhesives take about half of all phenol consumed in the U.S.

Phenol still managed a good first quarter even with sliding housing starts because of the time it takes for slackened demand for plywood to work its way back through production of adhesives and then to raw material phenol. Since plywood demand is expected to remain low this summer, phenol demand will fall during the second half of 1980.

This decline, combined with slowing demand in other outlets, including exports, prompts forecasts for a 10% or greater decline in phenol output this year. A year ago prospects seemed good for 1980 phenol production to top 3 billion lb for the first time, but instead output will drop to about 2.6 billion lb, possibly lower, from 2.9 billion lb in 1979.

Recovery might start very late in 1980 but will have little effect on 1980 production. Housing may turn up during the fourth quarter of the year, but this would be too late to pull up phenol production. Other uses of phenol affected by the recession may be due for a spotty recovery if interest rates and inflation are still fairly high.

On the supply side, phenol has no real problems. Plant capacity increased in the first quarter from 3.4 billion lb to 3.6 billion lb. More new capacity is under construction or planned for possible production two or more years from now.

Hence, for two or three years, any phenol capacity lost to shutdowns for maintenance or startup difficulties in new units can easily be made up at other plants. Supplies of feedstock cumene and its raw materials, benzene and propylene, are good, although prices may increase during the year.

Prices for phenol have risen considerably during the past year as producers passed on costs of materials increased by crude oil price hikes. However, some temporary voluntary allowances (discounts) now exist from current posted phenol prices. This in theory could give producers of the chemical a chance to improve financial returns if demand increases.

But for the moment, sentiment concerns only more discounting or, alternatively, reducing production to levels of contract sales to minimize spot sales at unprofitable prices. If phenol demand slows further as expected in the second half of 1980, price increases should be minimal or nonexistent unless crude oil prices shoot up.

Lower effective prices can't do much to spur phenol consumption. No significant competitor at any price exists for phenol-formaldehyde resins, for bisphenol-A in epoxy or polycarbonate resins, or for phenol derivatives in a host of small-volume uses. Also, phenol is a very small part of the total cost in many of the durable products in which it reaches the final consumer.

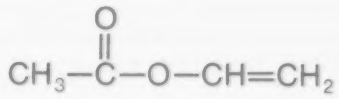
Besides housing, another vital durables market for phenol is autos. Since U.S. auto sales are down a third or more from a year ago, phenol use in brake linings, sand molds for castings, engineering plastics parts, and electrical parts has suffered.

Phenol exports also are expected to feel the impact of recession as it moves through the world. U.S. exports will decline at least 10% and possibly 20% from the 1979 level of about 270 million lb.

About the brightest part of the outlook for phenol is low inventories downstream. Inventories of plywood are well down from traditional levels as manufacturers severely limit production to keep in line with construction demand. These low inventories mean that demand for phenol could rise rapidly once housing demand starts to rise. Similar low inventories and rapid recovery prospects exist for other end uses of phenol.

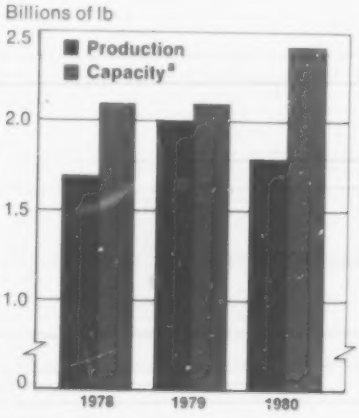
For the moment, however, 1980 will not be a banner year for phenol. Producers can't be optimistic, since they recall that in the previous 1974–75 recession phenol production slumped about 25% in much the same durables climate as today.

Vinyl Acetate



- *Demand slowing*
- *Capacity adequate*
- *Prices stable*

PRODUCTION/CAPACITY



a As of first quarter.

HOW MADE

Reaction of acetic acid, ethylene, and oxygen

MAJOR DERIVATIVES

Polymers 55%, polyvinyl alcohol 20%

MAJOR END USES

Adhesives 30%, paint 30%

FOREIGN TRADE

Exports—down from 600 million lb in 1979 to less than 400 million lb in 1980, imports—negligible

PRICES

Contracts 34 cents a lb with discounts

COMMERCIAL VALUE

$550 million for total production, 1979; $650 million, 1980

In 1980, U.S. vinyl acetate producers will have much the same type of problems afflicting phenol. Both U.S. demand and exports will decline, bringing total production down 5 to 10% from 1979 to 1.8 billion lb.

Plant capacity will hold at about 2.4 billion lb, with no expansions other than minor debottlenecking expected this year. Certainly in 1980 and 1981 no further capacity will be necessary and producers may have to tolerate an excess.

Prices, now posted at about 34 cents a lb, are up about 20% from a year ago. However, significant further increases will come only if ethylene prices are pushed up by a major crude oil price rise. Ethylene prices are declining at present.

Vinyl acetate output is due for a pause this year after several years of substantial growth. The reason is the same as for phenol—the housing market. A majority of vinyl acetate production eventually ends up in houses, largely as adhesives and coatings, but also as a host of other products. The impact of a radical slowdown in new housing starts certainly will affect vinyl acetate demand, although not so greatly as it will affect phenol.

Paint, a big consumer of polyvinyl acetate emulsions, is relatively less affected by a slowdown in housing than are adhesives for plywood, the major use of phenol. Paint has a shorter lifetime than plywood for both aesthetic and performance reasons. Hence, at times like the present, when new houses are expensive and when more home owners are unemployed, repainting flourishes.

The result is that trade sales of paints, usually through retail outlets, rise during a recession. If this occurs as expected during the current recession, vinyl acetate demand will hold up better than would be expected strictly from the decline in new housing starts.

Adhesive uses, the other major housing application of polyvinyl acetate, range from holding panel walls together in mobile homes to giving textured surfaces to wallboard.

Frequently, adhesives of polyvinyl acetate contain varying quantities of polyvinyl alcohol, another vinyl acetate derivative. The alcohol acts as a thickener and as an additive with polyvinyl acetate and cellulosic materials in making rewettable adhesives for labels and tapes.

Since paints and adhesives account for more than 60% of U.S. consumption of vinyl acetate, it is easy to see why, in a recession, demand will be under downward pressure. But other derivatives often are affected even more by an economic downturn.

For example, about 10% of vinyl acetate production goes into various kinds of textile and other sizings (surface-treating agents), either as polyvinyl acetate or alcohol. Since textiles already are suffering from the recession, these uses also will slump. Another smaller sizing use currently hurting is in glass fibers used in reinforced-plastic products such as boats.

Exports account for a relatively large share of vinyl acetate production, reaching nearly 25% of the total during 1979. This is a very high percentage for a U.S. organic chemical. The cost advantage of U.S. ethylene producers led to such large derivatives exports even with growing capacity in other parts of the world.

As the U.S. cost advantage diminishes and more capacity for vinyl acetate and derivatives comes on stream outside the U.S., exports from this country are expected to decline. A recession worldwide would hasten the export decline in 1980 to less than 20% of U.S. production.

Reduced production of vinyl acetate certainly will hurt the production cost picture and profitability in 1980. However, most producers buy the ethylene needed on the merchant market, where prices are currently falling. Also, producers are going to cheaper processes for making acetic acid from methanol. As a result, their cost controls might be better than in other chemicals, and producers may be able to slow the expected decline in profitability.

Overall though, vinyl acetate producers, like those of most other U.S. chemicals, will have to wait out the recession and work at keeping plant operating efficiency as high as possible, given lower operating rates. No new uses of any size will appear to offset declines in existing major uses, many of which already dominate the markets they are in.